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ABSTRACT

A study explored the combined effects of morphological clues and contextual clues in the interpretation of novel words while reading in a second language. More specifically, it examined the ability of 74 less-proficient English-speaking learners of Japanese (college students learning Japanese during a summer intensive language program in Japan) to combine information from word components and information from surrounding context to infer the meanings of unknown kanji compounds (i.e., words consisting of two or more Chinese characters). Although the combined effect of the two types of information sources could be additive overall, the effect must be discussed in terms of individual differences in the learners' ability to integrate information. (Contains 12 references and 3 tables of data.) (Author/RS)

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Running head: INDIVIDUAL DIFFERENCES IN INTEGRATION

Individual Differences in Integrating Information from Word Parts and Context in Interpreting Novel Words

A Paper to be Presented at the Annual Meeting of American Educational Research Association

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Abstract

This study explores the combined effects of morphological clues and contextual clues in the interpretation of novel words while reading in a second language. More specifically, it examines the ability of less-proficient English-speaking learners of Japanese to combine information from word components and information from surrounding context to infer the meanings of unknown kanji compounds (i.e., words consisting of two or more Chinese characters). Although the combined effect of the two types of information sources additive overall, it must be discussed in terms of individual differences in the learners' ability to integrate information.

Learners of Japanese encounter a huge number of new words while reading authentic printed materials. Many of these words are in the form of kanji compounds, each word consisting of two or more kanji characters. Kanji compounds, which constitute a crucial part of written Japanese, are often semantically semi-transparent, that is, the individual characters are often familiar but the meaning of a word as a whole is often not obvious based on its component characters alone. For instance, the meaning of seishun (adolescence) is not a simple function of the meanings of its component characters, ao (the color of blue) and haru (the spring season). Most kanji compounds fall in this category, which explains why many learners of Japanese find it difficult to obtain the exact meanings of novel kanji words even when they know the primary meanings of the individual characters.

This situation is certainly not unique to Japanese. The bulk of low-frequency vocabulary in written English consists of morphologically complex words build through compounding, prefixation, and affixation. In many cases, the parts of a word give significant but incomplete meanings about the word as a whole (Nagy & Anderson, 1984). Therefore, the reader must use information from context, as well as information from word components while interpreting unfamiliar words without referring to a dictionary. Adult language learners demonstrate the ability to analyze the semantic structures of unfamiliar morphologically complex words (Arden-Close, 1993; Bensoussan & Laufer, 1984) and the ability to infer the meanings of unknown words based on contextual clues (Dubin & Olshtain, 1993; Dupuy & Krashen, 1993; Huckin & Bloch, 1993; Li, 1988; Mondria & Wit-de Boer, 1991). Thus, second language readers should be able to combine the two types of information to obtain better word meanings.

An important question is how much students gain from morphological clues and contextual information combined. Previous research obtained different results regarding the combined effect of the types of information. Shu, Anderson, and Zhang (1995) obtained a synergistic effect of morphological transparency and learning from context, that is, morphologically transparent Chinese words were learned better in context than opaque words. In Mori and Nagy (1999), however, the combined effect of the two sources of information was greater than the effect of a

single source but less than a summation of the two. The effects of the two types of clues could be non-additive, too. McKeown (1985) observed that multiple contexts confused low-ability students. Parry (1997) also observed that some students appear to approach unfamiliar words analytically but fail to look at the larger context, and others seem to focus on the broader context but miss information from word parts. These research findings suggest that the combined effect of multiple sources of information must be examined in terms of individual differences.

Therefore, the present study addresses two research questions:

1. Are the effects of word parts and context additive or synergistic in general?
2. How is the combined effect of the two types of clues different among individual students?

This paper will first examine the overall effects of kanji clues, contextual clues, and the availability of the two types of information, respectively. Then, it will investigate an interaction between the combined effect of the two types of clues and individual differences.

Method

Participants

Seventy-four 74 English-speaking college students learning Japanese as a foreign language participated in this study. Data were collected in a summer intensive language program in Japan.

Instruments

The participants were asked to infer the meanings of 45 unfamiliar kanji compounds. The individual kanji characters used in the target compounds were familiar to the participants, as confirmed by a kanji questionnaire administered prior to the test. The 45 target kanji compounds were randomly divided into three sets, each of which consisted of 15 words. Each word set was assigned to one of the three conditions: (a) the Kanji Only Condition in which kanji compounds were presented in isolation; (b) the Context Only Condition in which participants received Japanese sentences with target words omitted; and (c) the Both Kanji and Context Condition in which kanji compounds were presented within sentences. In each condition, the participants were asked to write two or three possible meanings of each target word in English. Then, they circled the answer that they considered to be the best among given choices.

Data Coding

Participants' guesses were rated by two graduate students of linguistics in terms of the semantic relatedness between a best answer and the meaning of a target compound on a five-point scale, ranging from 0 as "No semantic overlap" to 4 as "Identical meaning." Discrepancies in the two raters' ratings were adjusted through a discussion until the inter-raters' reliability became .93. The mean scores of the two raters' ratings were used as the dependent variable (Semantic Relatedness).

The participants' mean scores (i.e., Semantic Relatedness) in the three conditions were interpreted as representing their ability to use kanji clues, the ability to use contextual clues, and the ability to integrate the two types of clues, respectively. Since all the participants received three conditions, each of them had the three ability measures. The effect of an available clue(s) was also examined in terms of Semantic Relatedness in each condition.

Results and Discussion

As Table 1 indicates, the mean of Semantic Relatedness in the Both Kanji and Context Condition (1.39) is almost equal to a summation of that in the Kanji Only Condition (.71) and that in the Context Only Condition (.75). A repeated-measure's analysis with Condition as the within-subject factor confirmed a significant main effect of Condition. That is, the participants scored statistically significantly better when they received both kanji clues and contextual information than when they received a single source. Therefore, the answer to the first question is that the effects of word parts and context are additive in general.

Insert Table 1 here

An examination of individuals' scores in each condition, however, revealed at least three different response patterns (Table 2). One set of participants had similar scores in the Kanji Only Condition and in the Both Kanji and Context Condition, and scored lower in the Context Only Condition. This response pattern suggests that they generally preferred kanji clues and over-relied

on them even when contextual clues were also available. Another group of participants showed the reverse tendency of preferring contextual clues over kanji clues. The last group were the integrators, whose score in the Both Kanji and Context Condition was much higher than either in the Kanji Only Condition or in the Context Only Condition.

Insert Table 2 here

Since there was little overlap between the three groups, the 74 participants were classified into one of the three types based on their scores in the three conditions: (a) Kanji users, those who showed similar scores in the Kanji Only Condition and in the Both Kanji and Context Condition, both of which were higher than that in the Context Only Condition (n = 24); (b) Context users, those who showed similar scores in the Context Only Condition and in the Both Kanji and Context Condition, both of which were higher than that in the Kanji Only Condition (n = 25); and (c) Integrators, those who scored substantially higher in the Both Kanji and Context Condition than either in the Kanji Only Condition or in the Context Only Condition (n = 25).

Insert Table 3 here

A repeated measure's factorial analysis with Semantic Relatedness as the dependent variable, Condition as the within-subject factor, and Student Type as the between-subject factor revealed a significant interaction effect between Condition and Student Type [$F(4, 142) = 34.41$, $p < .00$)]. As Table 3 indicates, the three groups of students behaved differently. Kanji users, whose ability to use kanji clues (.99) was higher than their ability to use contextual clues (.53), did not gain much from the two information sources combined (1.19). Similarly, Context users, whose contextual ability (1.03) was higher than their kanji ability (.47), did not gain much from multiple information sources (1.14). These results suggest that, for some kanji users and context users, the two types of information do not work in an additive way. In contrast, Integrators gained

noticeably higher from the two types of clues combined (1.84) than from kanji clues only (.69) or context only (.67). This means that, for some students, the effects of word parts and context are more than additive (synergistic). The main effect of Student Type was not significant [$F(2, 71) = 1.55$, $p > .20$)], which means that the three groups of students did not differ in overall abilities.

Thus, the answer to the second question is that the combined effect of morphological and contextual clues depends on individuals. Some students tremendously gain from multiple sources of information, even with their limited abilities in using certain types of clues. In other words, integrators' understanding of unknown words becomes much better when morphological clues are combined with contextual information. Those who tend to over-rely on a particular type of clues, on the other hand, are not helped much by the availability of multiple sources of information.

To identify possible sources of individual differences, I examined proficiency data obtained from 56 participants. Proficiency in Japanese, however, did not interact with Student Type, which means that high knowledge in a target language is not associated with any student type. As shown in Table 2, not all integrators are high-ability students. Some integrators are low in the ability to utilize one type of clues but still integrate information. In contrast, some kanji users or context users show higher abilities in utilizing either kanji or contextual clues but do not gain much from the two sources combined.

Implications

Although integration of multiple sources of information generally leads to a better understanding of word meanings, this study has demonstrated that the combined effect of morphological and contextual clues depends on individuals' ability to integrate information. The two effects could be additive, or even synergistic, for some students but are not for others. More importantly, non-integrators are not necessarily low-proficiency or low-ability students. Since the increase in knowledge in a target language does not guarantee success in integration, other factors, such as general language aptitude, metalinguistic awareness about word meanings, and metacognitive awareness on learning strategies, must be examined to identify the source of individual differences.

If teachers want to encourage students to integrate information, they must clarify what would happen if readers base their guesses solely on a certain type of clues. Teachers also need to know what types of students fail to combine information. This study provides some information that should be considered in any attempt to raise students' consciousness on strategies for vocabulary learning. Given that even advanced learners could over-rely on a particular type of information, some form of metacognitive instruction might be necessary, regardless of proficiency. An important question for future research is the extent to which instruction can influence learner strategies.

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Table 1

Means and Standard Deviations of Semantic Relatedness between Students' Best Answers and the Meanings of Target Compounds in the Three Conditions

Condition	n	M*	(SD)
Kanji Only	74	.71	(.42)
Context Only	74	.75	(.38)
Both Kanji and Context	74	1.39	(.72)

*The maximum score [illegible].

Table 2

Three Types of Students Who Show Different Response Patterns in the Three Conditions

	Condition		
Student ID Number	Kanji Only	Context Only	Both Kanji and Context
Kanji Users			
23	1.97	.90	2.07
28	1.50	.63	1.80
43	1.07	.27	1.00
17	.87	.43	.83
19	.57	.07	.40
Context Users			
69	.19	1.71	1.60
65	.58	1.43	1.43
53	.57	1.10	1.23
51	.43	.90	.93
75	.17	.57	.54
Integrators			
5	1.23	1.00	3.03
18	.57	.71	2.07
41	.40	.50	1.47
68	.23	.27	.93
44	.27	.33	.63

Table 3

Means and Standard Deviations of Semantic Relatedness of the Three Types of Students in the Three Conditions

		Condition					
		Kanji Only		Context Only		Both Kanji and Context	
Students Type	n	M*	(SD)	M*	(SD)	M*	(SD)
Kanji users	24	.99	(.45)	.53	(.30)	1.19	(.68)
Context users	25	.47	(.23)	1.03	(.34)	1.14	(.44)
Integrators	25	.69	(.40)	.67	(.33)	1.84	(.78)

*The maximum score is 4.